Dataset Integrity Check for Teen-LABS Study Analysis Data

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Contents

1 Standard Disclaimer

The intent of this DSIC is to provide confidence that the data distributed by the NIDDK repository is a true copy of the study data. Our intent is not to assess the integrity of the statistical analyses reported by study investigators. As with all statistical analyses of complex datasets, complete replication of a set of statistical results should not be expected in secondary analysis. This occurs for a number of reasons including differences in the handling of missing data, restrictions on cases included in samples for a particular analysis, software coding used to define complex variables, etc. Experience suggests that most discrepancies can ordinarily be resolved by consultation with the study data coordinating center (DCC), however this process is labor-intensive for both DCC and Repository staff. It is thus not our policy to resolve every discrepancy that is observed in an integrity check. Specifically, we do not attempt to resolve minor or inconsequential discrepancies with published results or discrepancies that involve complex analyses, unless NIDDK Repository staff suspect that the observed discrepancy suggests that the dataset may have been corrupted in storage, transmission, or processing by repository staff. We do, however, document in footnotes to the integrity check those instances in which our secondary analyses produced results that were not fully consistent with those reported in the target publication.

2 Study Background

Teen-LABS proposes that bariatric surgery is more beneficial to extremely obese patients when it's done during the adolescent years instead of adulthood. By using duration of obesity as the moderating variable, the Teen-LABS study will estimate the risks and benefits of bariatric surgery among adolescent patients in comparison with adult patients. At least 200 adolescent bariatric patients will be recruited from four centers and undergo gastric bypass surgery between 2007 and 2012. Post-surgery data and biospecimens will be obtained at pre-determined points during a 24 month period. The assessments of the Teen-LABS subjects will be compared with similar data from the adult subjects of the LABS study. The objective of the Teen-LABS study is to use standardized techniques to assess the short and longer-term safety and efficacy of bariatric surgery in adolescents compared to adults. Teen LABS will compare health risks and psychosocial status between adolescents and adults undergoing bariatric surgery. Early (30 day) and intermediate term (1-2 year) health risks will be assessed. Psychosocial status will include eating behaviors, depressive symptoms, and health related quality of life.

3 Archived Datasets

All the SAS data files, as provided by the Data Coordinating Center (DCC), are located in the Teen-LABS folder in the data package. For this replication, variables were taken from the "variable_listing_nejm.sas7bdat", "complications_nejm.sas7bdat", and "Events and Person time data NIH data repository 03_20_17.xlsx" datasets.

4 Statistical Methods

Analyses were performed to duplicate results for the data published by Inge et al [1] in the New England Journal of Medicine in 2016. To verify the integrity of the dataset, descriptive statistics were computed.

5 Results

For Table 1 in the publication [1], <u>Demographic, Anthropometric, and Procedural Characteristics of the Participants</u>, Table A lists the variables that were used in the replication and Table B compares the results calculated from the archived data file to the results published in Table 1. The results of the replication are almost an exact match to the published results.

For Table 2 in the publication [1], <u>Prevalence and Remission of Coexisting Conditions</u>, Table C lists the variables that were used in the replication and Table D compares the results calculated from the archived data file to the results published in Table 2. The results of the replication are almost an exact match to the published results.

For Table 3 in the publication [1], <u>Nutritional and Related Abnormalities</u>, Table E lists the variables that were used in the replication and Table F compares the results calculated from the archived data file to the results published in Table 3. The results of the replication are almost an exact match to the published results.

For Table 4 in the publication [1], <u>Intraabdominal Operations and Other Related Procedures from 31 Days to 3 Years after the Bariatric Procedure</u>, Table G lists the variables that were used in the replication and Table H compares the results calculated from the archived data file to the results published in Table 4. The results of the replication are almost an exact match to the published results.

6 Conclusions

The NIDDK repository is confident that the Teen-LABS analysis data files to be distributed are a true copy of the study data.

7 References

[1] Inge, T.H., Courcoulas, A.P., Jenkins, T.M., Michalsky, M.P., Helmrath, M.A., Brnadt, M.L., Harmon, C.M., Zeller, M.H., Chen, M.K., Xanthakos, S.A., Horlick, M., Buncher, C.R., and the Teen-LABS Consortium. "Weight Loss and Health Status 3 Years after Bariatric Surgery in Adolescents". New England Journal of Medicine (2016) 374(2):113-123.

Table A: Variables used to replicate Table 1**:** Demographic, Anthropometric, and Procedural Characteristics of the Participants

Table Variable	dataset.variable
Age	variable_listing_nejm.ageatsurg
Sex	variable_listing_nejm.sex
Race or ethnic background	variable_listing_nejm.race
Hispanic ethnic background	variable_listing_nejm.ethn
Household income	variable_listing_nejm.pcghincome
Caregiver level of education	variable_listing_nejm.pcgeduc
Weight	variable_listing_nejm.weight
Height	variable_listing_nejm.height
BMI	variable_listing_nejm.bmi
Visit	variable_listing_nejm.visit
Gastric Bypass vs. Sleeve Gastrectomy	variable_listing_nejm.surg

Table B: Comparison of values computed in integrity check to reference article Table 1 values

Characteristic	All Participants (N=228) Manuscript	All Participants (N=228) DSIC	Diff. (N=0)
Age-yr	17±1.6	17±1.6	0±0
Age group-no. (%)			
13-15 yr	66 (29)	62 (27)	4 (2)
16-17 yr	94 (41)	91 (40)	3 (1)
18-19 yr	68 (30)	74 (33)	6 (3)
Sex-no. (%)			
Female	171 (75)	171 (75)	0 (0)
Male	57 (25)	57 (25)	0 (0)
Race or ethnic background-no. (%)			
White	164 (72)	164 (72)	0 (0)
Black	50 (22)	50 (22)	0 (0)
Asian	1 (<1)	1 (<1)	0 (0)
American Indian or Alaskan native	1 (<1)	1 (<1)	0 (0)
More than one race or ethnic background	12 (5)	12 (5)	0 (0)
Hispanic ethnic background-no. (%)	16 (7)	16 (7)	0 (0)

Characteristic	All Participants (N=228) Manuscript	All Participants (N=228) DSIC	Diff. (N=0)
Household income-no./total no. (%)			
<$25,000	83/218 (38)	83/218 (38)	0/0 (0)
$25,000-$49,999	44/218 (20)	44/218 (20)	0/0 (0)
$50,000-$74,999	38/218 (17)	38/218 (17)	0/0 (0)
≥$75,000	53/218 (24)	53/218 (24)	0/0 (0)
Caregiver level of education-no./total no. (%)			
Less than high school	23/221 (10)	23/221 (10)	0/0 (0)
High-school graduate	68/221 (31)	68/221 (31)	0/0 (0)
Some college	89/221 (40)	89/221 (40)	0/0 (0)
College graduate	41/221 (19)	41/221 (19)	0/0 (0)
Mean weight (95% CI)			
Baseline-kg	149 (145 to 153)	149 (145 to 153)	0 (0 to 0)
3 Yr-kg	108 (103 to 113)	109 (104 to 113)	1 (1 to 0)
Absolute change-kg	-41 (-45 to -37)	-41 (-45 to -36)	0 (0 to 1)
Percent change	-27 (-29 to -25)	-27 (-29 to -25)	0 (0 to 0)
Mean height (95% CI)			
Baseline-cm	167.9 (166.7 to 169.1)	167.9 (166.7 to 169.1)	0 (0 to 0)
3 Yr-cm	168.3 (166.9 to 1697)	168.3 (166.9 to 169.7)	0 (0 to 0)
Absolute change-cm	0.51 (0.23 to 0.80)	0.51 (0.23 to 0.80)	0 (0 to 0)
Percent change	0.31 (0.14 to 0.48)	0.31 (0.14 to 0.48)	0 (0 to 0)
Mean BMI (95% CI)			
Baseline	53 (51 to 54)	53 (51 to 54)	0 (0 to 0)
3 Yr	38 (37 to 40)	38 (37 to 40)	0 (0 to 0)
Absolute change	-15 (-16 to -13)	-15 (-16 to -13)	0 (0 to 0)
Percent change	-28 (-30 to -25)	-28 (-30 to -26)	0 (0 to 1)

Characteristic	Gastric Bypass (N=161) Manuscript	Gastric Bypass (N=161) DSIC	Diff. (N=0)
Age-yr	17±1.5	17±1.6	0±0.1
Age group-no. (%)			
13-15 yr	42 (26)	41 (26)	1 (0)
16-17 yr	71 (44)	68 (43)	3 (1)
18-19 yr	48 (30)	51 (32)	3 (2)
Sex-no. (%)			
Female	126 (78)	126 (78)	0 (0)
Male	35 (22)	35 (22)	0 (0)
Race or ethnic background-no. (%)			
White	119 (74)	119 (74)	0 (0)
Black	35 (22)	35 (22)	0 (0)
Asian	1 (1)	1 (1)	0 (0)
American Indian or Alaskan native	0	0	0
More than one race or ethnic background	6 (4)	6 (4)	0 (0)
Hispanic ethnic background-no. (%)	15 (9)	15 (9)	0 (0)
Household income-no./total no. (%)			
<$25,000	51/156 (33)	51/156 (33)	0/0 (0)
$25,000-$49,999	31/156 (20)	31/156 (20)	0/0 (0)
$50,000-$74,999	28/156 (18)	28/156 (18)	0/0 (0)
≥$75,000	46/156 (29)	46/156 (29)	0/0 (0)
Caregiver level of education-no./total no. (%)			
Less than high school	11/157 (7)	11/157 (7)	0/0 (0)
High-school graduate	47/157 (30)	47/157 (30)	0/0 (0)
Some college	67/157 (43)	67/157 (43)	0/0 (0)
College graduate	32/157 (20)	32/157 (20)	0/0 (0)
Mean weight (95% CI)			
Baseline-kg	151 (146 to 156)	151 (146 to 156)	0 (0 to 0)
3 Yr-kg	109 (104 to 115)	110 (104 to 116)	1 (0 to 1)
Absolute change-kg	-42 (-47 to -38)	-43 (-47 to -38)	1 (0 to 0)

Characteristic	Gastric Bypass (N=161) Manuscript	Gastric Bypass (N=161) DSIC	Diff. (N=0)
Percent change	-28 (-30 to -25)	-28 (-30 to -25)	0 (0 to 0)
Mean height (95% CI)			
Baseline-cm	167.5 (166.2 to 168.9)	167.5 (166.2 to 168.9)	0 (0 to 0)
3 Yr-cm	168.3 (166.7 to 169.8)	168.3 (166.7 to 169.8)	0 (0 to 0)
Absolute change-cm	0.54 (0.20 to 0.88)	0.54 (0.20 to 0.88)	0 (0 to 0)
Percent change	0.32 (0.12 to 0.53)	0.32 (0.12 to 0.53)	0 (0 to 0)
Mean BMI (95% CI)			
Baseline	54 (52 to 55)	54 (52 to 55)	0 (0 to 0)
3 Yr	39 (37 to 41)	39 (37 to 41)	0 (0 to 0)
Absolute change	-15 (-17 to -14)	-15 (-17 to -14)	0 (0 to 0)
Percent change	-28 (-31 to -25)	-28 (-31 to -26)	0 (0 to 1)

Characteristic	Sleeve Gastrectomy (N=67) Manuscript	Sleeve Gastrectomy (N=67) DSIC	Diff. (N=0)
Age-yr	17±1.7	16±1.7	1±0
Age group-no. (%)			
13-15 yr	24 (36)	21 (31)	3 (5)
16-17 yr	23 (34)	23 (34)	0 (0)
18-19 yr	20 (30)	23 (34)	3 (4)
Sex-no. (%)			
Female	45 (67)	45 (67)	0 (0)
Male	22 (33)	22 (33)	0 (0)
Race or ethnic background-no. (%)			
White	45 (67)	45 (67)	0 (0)
Black	15 (22)	15 (22)	0 (0)
Asian	0	0	0
American Indian or Alaskan native	1 (1)	1 (1)	0 (0)
More than one race or ethnic background	6 (9)	6 (9)	0 (0)
Hispanic ethnic background-no. (%)	1 (1)	1 (1)	0 (0)

Characteristic	Sleeve Gastrectomy (N=67) Manuscript	Sleeve Gastrectomy (N=67) DSIC	Diff. (N=0)
Household income-no./total no. (%)			
<$25,000	32/62 (52)	32/62 (52)	0/0 (0)
$25,000-$49,999	13/62 (21)	13/62 (21)	0/0 (0)
$50,000-$74,999	10/62 (16)	10/62 (16)	0/0 (0)
≥$75,000	7/62 (11)	7/62 (11)	0/0 (0)
Caregiver level of education-no./total no. (%)			
Less than high school	12/64 (19)	12/64 (19)	0/0 (0)
High-school graduate	21/64 (33)	21/64 (33)	0/0 (0)
Some college	22/64 (34)	22/64 (34)	0/0 (0)
College graduate	9/64 (14)	9/64 (14)	0/0 (0)
Mean weight (95% CI)			
Baseline-kg	144 (136 to 152)	144 (136 to 152)	0 (0 to 0)
3 Yr-kg	105 (96 to 113)	105 (96 to 114)	0 (0 to 1)
Absolute change-kg	-38 (-44 to -31)	-37 (-44 to -30)	1 (0 to 1)
Percent change	-26 (-30 to -22)	-26 (-30 to -21)	0 (0 to 1)
Mean height (95% CI)			
Baseline-cm	168.7 (166.1 to 171.2)	168.7 (166.1 to 171.2)	0 (0 to 0)
3 Yr-cm	168.5 (165.1 to 171.9)	168.5 (165.1 to 171.9)	0 (0 to 0)
Absolute change-cm	0.44 (-0.12 to 1.00)	0.44 (-0.12 to 1.00)	0 (0 to 0)
Percent change	0.25 (-0.07 to 0.57)	0.25 (-0.07 to 0.57)	0 (0 to 0)
Mean BMI (95% CI)			
Baseline	50 (48 to 52)	50 (48 to 52)	0 (0 to 0)
3 Yr	37 (34 to 39)	37 (34 to 39)	0 (0 to 0)
Absolute change	-13 (-15 to -11)	-13 (-15 to -11)	0 (0 to 0)
Percent change	-26 (-30 to -22)	-26 (-30 to -22)	0 (0 to 0)

Table C: Variables used to replicate Table 2**:** Prevalence and Remission of Coexisting Conditions

Table Variable	dataset.variable
Type 2 diabetes	variable_listing_nejm.dmconfirm, variable_listing_nejm.diabmed
Type 2 diabetes remission	variable_listing_nejm.hba1c, variable_listing_nejm.fasting, variable_listing_nejm.glu
Prediabetes	variable_listing_nejm.predmconfirm
Prediabetes Remission	variable_listing_nejm.hba1c, variable_listing_nejm.fasting, variable_listing_nejm.glu
Dyslipidemia	variable_listing_nejm.tgnet, variable_listing_nejm.hdl, variable_listing_nejm.ldl, variable_listing_nejm.lipidmed
Dyslipidemia remission	variable_listing_nejm.tgnet, variable_listing_nejm.hdl, variable_listing_nejm.ldl, variable_listing_nejm.lipidmed, variable_listing_nejm.ageatsurg, variable_listing_nejm.sex
Elevated blood pressure	variable_listing_nejm.sbp, variable_listing_nejm.dbp, variable_listing_nejm.bpmed, variable_listing_nejm.sbp_percentile, variable_listing_nejm.dbp_percentile, variable_listing_nejm.ageatsurg
Elevated blood pressure remission	variable_listing_nejm.sbp, variable_listing_nejm.dbp, variable_listing_nejm.bpmed
Abnormal kidney function	variable_listing_nejm.cysc, variable_listing_nejm.uacratio
Abnormal kidney function remission	variable_listing_nejm.cysc, variable_listing_nejm.uacratio
Visit	variable_listing_nejm.visit
Gastric Bypass vs. Sleeve Gastrectomy	variable_listing_nejm.surg

Table D: Comparison of values computed in integrity check to reference article Table 2 values

Baseline

Condition	Observed Prevalence of Condition no. of patients/total no. Manuscript	Observed Prevalence of Condition no. of patients/total no. DSIC	Diff.	% (95% CI) Manuscript	% (95% CI) DSIC	Diff.
Type 2 Diabetes						
Total	29/225	29/225	0/0	13 (9-17)	13 (9-17)	0 (0-0)
Gastric Bypass	23/159	23/159	0/0	14 (9-20)	14 (9-20)	0 (0-0)
Sleeve Gastrectomy	6/66	6/66	0/0	9 (2-16)	9 (2-16)	0 (0-0)
Prediabetes						
Total	19/194	19/194	0/0	10 (6-14)	10 (6-14)	0 (0-0)
Gastric Bypass	17/135	17/135	0/0	13 (7-18)	13 (7-18)	0 (0-0)

Condition	Observed Prevalence of Condition no. of patients/total no. Manuscript	Observed Prevalence of Condition no. of patients/total no. DSIC	Diff.	% (95% CI) Manuscript	% (95% CI) DSIC	Diff.
Sleeve Gastrectomy	2/59	2/59	0/0	3 (0-8)	3 (0-8)	0 (0-0)
Dyslipidemia						
Total	171/225	171/225	0/0	76 (70-82)	76 (70-82)	0 (0-0)
Gastric Bypass	126/160	126/160	0/0	79 (72-85)	79 (72-85)	0 (0-0)
Sleeve Gastrectomy	45/65	45/65	0/0	69 (58-80)	69 (58-80)	0 (0-0)
Elevated blood pressure						
Total	96/224	96/224	0/0	43 (36-49)	43 (36-49)	0 (0-0)
Gastric Bypass	73/159	73/159	0/0	46 (38-54)	46 (38-54)	0 (0-0)
Sleeve Gastrectomy	23/65	23/65	0/0	35 (24-47)	35 (24-47)	0 (0-0)
Abnormal kidney function						
Total	36/212	36/212	0/0	17 (12-22)	17 (12-22)	0 (0-0)
Gastric Bypass	29/153	29/153	0/0	19 (13-25)	19 (13-25)	0 (0-0)
Sleeve Gastrectomy	7/59	7/59	0/0	12 (4-20)	12 (4-20)	0 (0-0)

3 Years

Condition	Observed Prevalence of Remission no. of patients/total no. Manuscript	Observed Prevalence of Remission no. of patients/total no. DSIC	Diff.	% (95% CI) Manuscript	% (95% CI) DSIC	Diff.
Type 2 Diabetes						
Total	19/20	19/20	0/0	95 (85-100)	95 (85-100)	0 (0-0)
Gastric Bypass	17/18	16/17	1/1	94 (84-100)	94 (83-100)	0 (1-0)
Sleeve Gastrectomy	2/2	3/3	1/1	100 (100-100)	100 (100-100)	0 (0-0)
Prediabetes						
Total	13/17	13/17	0/0	76 (56-97)	76 (56-97)	0 (0-0)
Gastric Bypass	11/15	11/15	0/0	74 (51-96)	73 (51-96)	1 (0-0)
Sleeve Gastrectomy	2/2	2/2	0/0	100 (100-100)	100 (100-100)	0 (0-0)
Dyslipidemia						
Total	84/128	84/127	0/1	66 (57-74)	66 (58-74)	0 (1-0)
Gastric Bypass	66/95	66/94	0/1	69 (60-79)	70 (61-79)	1 (1-0)
Sleeve Gastrectomy	18/33	18/33	0/0	55 (38-71)	55 (38-72)	0 (0-1)
Elevated blood pressure						
Total	56/76	56/75	0/1	74 (64-84)	75 (65-85)	1 (1-1)

Condition	Observed Prevalence of Remission no. of patients/total no. Manuscript	Observed Prevalence of Remission no. of patients/total no. DSIC	Diff.	% (95% CI) Manuscript	% (95% CI) DSIC	Diff.
Gastric Bypass	47/60	47/59	0/1	78 (68-89)	80 (69-90)	2 (1-1)
Sleeve Gastrectomy	9/16	9/16	0/0	56 (32-81)	56 (32-81)	0 (0-0)
Abnormal kidney function						
Total	19/22	19/22	0/0	86 (72-100)	86 (72-100)	0 (0-0)
Gastric Bypass	16/19	16/19	0/0	84 (68-100)	84 (68-100)	0 (0-0)
Sleeve Gastrectomy	3/3	3/3	0/0	100 (100-100)	100 (100-100)	0 (0-0)

Table E: Variables used to replicate Table 3: Nutritional and Related Abnormalities

Table Variable	**dataset.variable**
Albumin	variable_listing_nejm.albs
Folate	variable_listing_nejm.folat
Vitamin B12	variable_listing_nejm.vb12
25-OH Vitamin D	variable_listing_nejm.vd
Parathyroid hormone	variable_listing_nejm.pth
Ferritin	variable_listing_nejm.fer
Transferrin	variable_listing_nejm.trsf
Vitamin A	variable_listing_nejm.vita
Vitamin B1 erythrocyte transkelotase activity	variable_listing_nejm.vitb1g
Visit	variable_listing_nejm.visit
Gastric Bypass vs. Sleeve Gastrectomy	variable_listing_nejm.surg

Table D: Comparison of values computed in integrity check to reference article Table 3 values

Baseline

Abnormality	Observed Prevalence no. of patients/total no. Manuscript	Observed Prevalence no. of patients/total no. DSIC	Diff.	% (95% CI) Manuscript	% (95% CI) DSIC	Diff.
Low albumin level						
Total	7/225	7/225	0/0	3 (1-5)	3 (1-5)	0 (0-0)
Gastric Bypass	7/160	7/160	0/0	4 (1-8)	4 (1-8)	0 (0-0)
Sleeve gastrectomy	0/65	0/65	0/0	0	0	0
Low folate level						
Total	6/173	6/173	0/0	3 (1-6)	3 (1-6)	0 (0-0)

Abnormality	Observed Prevalence no. of patients/total no. Manuscript	Observed Prevalence no. of patients/total no. DSIC	Diff.	% (95% CI) Manuscript	% (95% CI) DSIC	Diff.
Gastric Bypass	4/126	4/126	0/0	3 (<1-6)	3 (<1-6)	0 (0-0)
Sleeve gastrectomy	2/47	2/47	0/0	4 (0-10)	4 (0-10)	0 (0-0)
Low vitamin B12 level						
Total	1/222	1/222	0 (0)	<1 (0-1)	<1 (0-1)	0 (0-0)
Gastric Bypass	1/159	1/159	0/0	1 (0-2)	1 (0-2)	0 (0-0)
Sleeve gastrectomy	0/63	0/63	0/0	0	0	0
Low 25-OH vitamin D level						
Total	83/223	83/223	0/0	37 (31-44)	37 (31-44)	0 (0-0)
Gastric Bypass	71/159	71/159	0/0	45 (37-52)	45 (37-52)	0 (0-0)
Sleeve gastrectomy	12/64	12/64	0/0	19 (9-28)	19 (9-28)	0 (0-0)
High parathyroid hormone level						
Total	18/223	18/223	0/0	8 (5-12)	8 (5-12)	0 (0-0)
Gastric Bypass	17/159	17/159	0/0	11 (6-15)	11 (6-15)	0 (0-0)
Sleeve gastrectomy	1/64	1/64	0/0	2 (0-5)	2 (0-5)	0 (0-0)
Low ferritin level						
Total	11/225	11/225	0/0	5 (2-8)	5 (2-8)	0 (0-0)
Gastric Bypass	4/160	4/160	0/0	2 (<1-5)	3 (<1-5)	1 (0-0)
Sleeve gastrectomy	7/65	7/65	0/0	11 (3-18)	11 (3-18)	0 (0-0)
High transferrin level*						
Total	7/225	1/225	6/0	3 (1-5)	<1 (0-1)	3 (1-4)
Gastric Bypass	5/160	1/160	4/0	3 (<1-6)	1 (0-2)	2 (0-4)
Sleeve gastrectomy	2/65	0/65	2/0	3 (0-7)	0	3 (0-7)
Low vitamin A level						
Total	13/221	13/221	0/0	6 (3-9)	6 (3-9)	0 (0-0)
Gastric Bypass	9/158	9/158	0/0	6 (2-9)	6 (2-9)	0 (0-0)
Sleeve gastrectomy	4/63	4/63	0/0	6 (<1-12)	6 (<1-12)	0 (0-0)
High vitamin B1 erythrocyte transketolase activity level						
Total	2/217	2/217	0/0	1 (0-2)	1 (0-2)	0 (0-0)
Gastric Bypass	2/154	2/154	0/0	1 (0-3)	1 (0-3)	0 (0-0)
Sleeve gastrectomy	0/63	0/63	0/0	0	0	0

3 Years

Abnormality	Observed Prevalence no. of patients/total no. Manuscript	Observed Prevalence no. of patients/total no. DSIC	Diff.	% (95% CI) Manuscript	% (95% CI) DSIC	Diff.
Low albumin level						
Total	0/171	0/171	0/0	0	0	0
Gastric Bypass	0/127	0/127	0/0	0	0	0
Sleeve gastrectomy	0/44	0/44	0/0	0	0	0
Low folate level						
Total	10/132	10/132	0/0	8 (3-12)	8 (3-12)	0 (0-0)
Gastric Bypass	6/100	6/100	0/0	6 (1-11)	6 (1-11)	0 (0-0)
Sleeve gastrectomy	4/32	4/32	0/0	12 (1-24)	13 (1-24)	1 (0-0)
Low vitamin B12 level						
Total	13/160	13/160	0/0	8 (4-12)	8 (4-12)	0 (0-0)
Gastric Bypass	10/121	10/121	0/0	8 (3-13)	8 (3-13)	0 (0-0)
Sleeve gastrectomy	3/39	3/39	0/0	8 (0-16)	8 (0-16)	0 (0-0)
Low 25-OH vitamin D level						
Total	74/172	74/172	0/0	43 (36-50)	43 (36-50)	0 (0-0)
Gastric Bypass	61/128	61/128	0/0	48 (39-56)	48 (39-56)	0 (0-0)
Sleeve gastrectomy	13/44	13/44	0/0	30 (16-43)	30 (16-43)	0 (0-0)
High parathyroid hormone level						
Total	16/172	16/172	0/0	9 (5-14)	9 (5-14)	0 (0-0)
Gastric Bypass	15/128	15/128	0/0	12 (6-17)	12 (6-17)	0 (0-0)
Sleeve gastrectomy	1/44	1/44	0/0	2 (0-7)	2 (0-7)	0 (0-0)
Low ferritin level						
Total	98/171	98/171	0/0	57 (50-65)	57 (50-65)	0 (0-0)
Gastric Bypass	83/127	83/127	0/0	65 (57-74)	65 (57-74)	0 (0-0)
Sleeve gastrectomy	15/44	15/44	0/0	34 (20-48)	34 (20-48)	0 (0-0)
High transferrin level*						
Total	27/171	17/171	10/0	16 (10-21)	10 (5-14)	6 (5-7)
Gastric Bypass	25/127	17/127	8/0	20 (13-27)	13 (7-19)	7 (6-8)
Sleeve gastrectomy	2/44	0/44	2/0	5 (0-11)	0	5 (0-11)
Low vitamin A level						
Total	22/170	22/170	0/0	13 (8-18)	13 (8-18)	0 (0-0)
Gastric Bypass	20/126	20/126	0/0	16 (9-24)	16 (9-22)	0 (0-2)
Sleeve gastrectomy	2/44	2/44	0/0	5 (0-11)	5 (0-11)	0 (0-0)

Abnormality	Observed Prevalence no. of patients/total no. Manuscript	Observed Prevalence no. of patients/total no. DSIC	Diff.	% (95% CI) Manuscript	% (95% CI) DSIC	Diff.
High vitamin B1 erythrocyte transketolase activity level						
Total	1/172	1/172	0/0	1 (0-2)	1 (0-2)	0 (0-0)
Gastric Bypass	1/126	1/126	0/0	1 (0-4)	1 (0-2)	0 (0-2)
Sleeve gastrectomy	0/46	0/46	0/0	0	0	0

*Note that the definition of abnormal transferrin used in the DSIC is 392 mg/dL for males, as indicated in the manuscript supplemental materials. The values from the manuscript were calculated using the value 329 mg/dL for males, which is incorrect and thus results in the large discrepancy between the calculated values and the published results. The values in the DSIC are correct. Using the cutoff value of 329 mg/dL for males results in the results published in the manuscript.

Table E: Variables used to replicate Table 4: Intraabdominal Operations and Other Related Procedures from 31 Days to 3 Years after the Bariatric Procedure

Table Variable	dataset.variable
Procedure	complications_nejm.procedure
Gastric Bypass vs. Sleeve Gastrectomy	variable_listing_nejm.surg
Event Rate	Events and Person time data NIH data repository 03_20_17.pt, Events and Person time data NIH data repository 03_20_17.xlsx.events, Events and Person time data NIH data repository 03_20_17.xlsx.title, Events and Person time data NIH data repository 03_20_17.xlsx.surg

Table F: Values computed in integrity check to reference article Table 4 values

All Participants (N=228)

Procedure	Patients no. (%) Manuscript	Patients no. (%) DSIC	Diff.	Events no. Manuscript	Events no. DSIC	Diff.
Intraabdominal operations	30 (13)	30 (13)	0 (0)	47	47	0
Ventral hernia repair	1 (<1)	1 (<1)	0 (0)	1	1	0
Exploratory laparotomy	3 (1)	3 (1)	0 (0)	3	3	0
Wound drainage	2 (1)	2 (1)	0 (0)	2	2	0
Lysis of adhesions	4 (2)	4 (2)	0 (0)	6	6	0
Gastrostomy	4 (2)	4 (2)	0 (0)	5	5	0

Procedure	Patients no. (%) Manuscript	Patients no. (%) DSIC	Diff.	Events no. Manuscript	Events no. DSIC	Diff.
Sleeve gastrectomy converted to gastric bypass	1 (1)	1 (<1)	0 (0)	1	1	0
Appendicostomy for antegrade enemas	1 (<1)	1 (<1)	0 (0)	1	1	0
Repair of internal hernia	3 (1)	3 (1)	0 (0)	5	5	0
Bowel resection or diverting stoma	2 (1)	2 (1)	0 (0)	2	2	0
Luminal stent placement for leak	1 (<1)	1 (<1)	0 (0)	1	1	0
Cholecystectomy	18 (8)	18 (8)	0 (0)	18	18	0
Appendectomy	2 (1)	2 (1)	0 (0)	2	2	0
Endoscopic procedures	29 (13)	29 (13)	0 (0)	48	48	0
Upper gastrointestinal tract endoscopy	21 (9)	21 (9)	0 (0)	37	37	0
Stricture dilation	9 (4)	9 (4)	0 (0)	11	11	0

Procedure	Rate events per 300 person-years Manuscript	Rate events per 300 person-years DSIC	Diff.
Intraabdominal operations	22.3	23.6	1.3
Ventral hernia repair	0.5	0.5	0
Exploratory laparotomy	1.4	1.4	0
Wound drainage	1.0	1.0	0
Lysis of adhesions	2.9	2.9	0
Gastrostomy	2.4	2.4	0
Sleeve gastrectomy converted to gastric bypass	1.7	1.7	0
Appendicostomy for antegrade enemas	0.5	0.5	0
Repair of internal hernia	2.4	2.4	0
Bowel resection or diverting stoma	1.0	1.0	0
Luminal stent placement for leak	0.5	0.5	0
Cholecystectomy	8.6	8.6	0

Procedure	Rate events per 300 person-years Manuscript	Rate events per 300 person-years DSIC	Diff.
Appendectomy	1.0	1.0	0
Endoscopic procedures	22.8	22.8	0
Upper gastrointestinal tract endoscopy	17.6	17.6	0
Stricture dilation	5.2	5.2	0

Gastric Bypass (N=161)

Procedure	Patients no. (%) Manuscript	Patients no. (%) DSIC	Diff.	Events no. Manuscript	Events no. DSIC	Diff.
Intraabdominal operations	23 (14)	23 (14)	0 (0)	38	38	0
Ventral hernia repair	0	0	0	0	0	0
Exploratory laparotomy	3 (2)	3 (2)	0 (0)	3	3	0
Wound drainage	1 (1)	1 (1)	0 (0)	1	1	0
Lysis of adhesions	4 (2)	4 (2)	0 (0)	6	6	0
Gastrostomy	4 (2)	4 (2)	0 (0)	5	5	0
Sleeve gastrectomy converted to gastric bypass	NA	NA	NA	NA	NA	NA
Appendicostomy for antegrade enemas	0	0	0	0	0	0
Repair of internal hernia	3 (2)	3 (2)	0 (0)	5	5	0
Bowel resection or diverting stoma	2 (1)	2 (1)	0 (0)	2	2	0
Luminal stent placement for leak	0	0	0	0	0	0
Cholecystectomy	15 (9)	15 (9)	0 (0)	15	15	0
Appendectomy	1 (1)	1 (1)	0 (0)	1	1	0
Endoscopic procedures	24 (15)	24 (15)	0 (0)	41	41	0
Upper gastrointestinal tract endoscopy	16 (10)	16 (10)	0 (0)	31	31	0
Stricture dilation	8 (5)	8 (5)	0 (0)	10	10	0

Procedure	Rate events per 300 person-years Manuscript	Rate events per 300 person-years DSIC	Diff.
Intraabdominal operations	25.0	25.0	0
Ventral hernia repair	0	0	0
Exploratory laparotomy	2.0	2.0	0
Wound drainage	0.7	0.7	0
Lysis of adhesions	3.9	3.9	0
Gastrostomy	3.3	3.3	0
Sleeve gastrectomy converted to gastric bypass	NA	NA	NA
Appendicostomy for antegrade enemas	0	0	0
Repair of internal hernia	3.3	3.3	0
Bowel resection or diverting stoma	1.3	1.3	0
Luminal stent placement for leak	0	0	0
Cholecystectomy	9.9	9.9	0
Appendectomy	0.7	0.7	0
Endoscopic procedures	27.0	27.0	0
Upper gastrointestinal tract endoscopy	20.4	20.4	0
Stricture dilation	6.6	6.6	0

Sleeve Gastrectomy (N=67)

Procedure	Patients no. (%) Manuscript	Patients no. (%) DSIC	Diff.	Events no. Manuscript	Events no. DSIC	Diff.
Intraabdominal operations	7 (10)	7 (10)	0 (0)	9	9	0
Ventral hernia repair	1 (1)	1 (1)	0 (0)	1	1	0
Exploratory laparotomy	0	0	0	0	0	0
Wound drainage	1 (1)	1 (1)	0 (0)	1	1	0
Lysis of adhesions	0	0	0	0	0	0
Gastrostomy	0	0	0	0	0	0
Sleeve gastrectomy converted to gastric bypass	1 (1)	1 (1)	0 (0)	1	1	0

Procedure	Patients no. (%) Manuscript	Patients no. (%) DSIC	Diff.	Events no. Manuscript	Events no. DSIC	Diff.
Appendicostomy for antegrade enemas	1 (1)	1 (1)	0 (0)	1	1	0
Repair of internal hernia	0	0	0	0	0	0
Bowel resection or diverting stoma	0	0	0	0	0	0
Luminal stent placement for leak	1 (1)	1 (1)	0 (0)	1	1	0
Cholecystectomy	3 (4)	3 (4)	0 (0)	3	3	0
Appendectomy	1 (1)	1 (1)	0 (0)	1	1	0
Endoscopic procedures	5 (7)	5 (7)	0 (0)	7	7	0
Upper gastrointestinal tract endoscopy	5 (7)	5 (7)	0 (0)	6	6	0
Stricture dilation	1 (1)	1 (1)	0 (0)	1	1	0

Procedure	Rate events per 300 person-years Manuscript	Rate events per 300 person-years DSIC	Diff.
Intraabdominal operations	15.4	15.4	0
Ventral hernia repair	1.7	1.7	0
Exploratory laparotomy	0	0	0
Wound drainage	1.7	1.7	0
Lysis of adhesions	0	0	0
Gastrostomy	0	0	0
Sleeve gastrectomy converted to gastric bypass	1.7	1.7	0
Appendicostomy for antegrade enemas	1.7	1.7	0
Repair of internal hernia	0	0	0
Bowel resection or diverting stoma	0	0	0
Luminal stent placement for leak	1.7	1.7	0
Cholecystectomy	5.1	5.1	0
Appendectomy	1.7	1.7	0

Procedure	Rate events per 300 person-years Manuscript	Rate events per 300 person-years DSIC	Diff.
Endoscopic procedures	12.0	12.0	0
Upper gastrointestinal tract endoscopy	10.2	10.2	0
Stricture dilation	1.7	1.7	0

Attachment A: SAS Code

```
*** Teen-LABS Ancillary DSIC;
***
*** Programmer: Allyson Mateja;
*** Date: 2/23/2017;

libname tlabsdat '/prj/niddk/ims_analysis/Teen_Labs/private_orig_data/TeenLABS_NEJMUpdated/';

proc format;
        value surgf 1 = 'Gastric Bypass'
                    5 = 'Sleeve Gastrectomy';
        value agef 1 = '13-15 yr'
                   2 = '16-17 yr'
                   3 = '18-19 yr';
        value sexf 1 = 'Male'
                   2 = 'Female';
        value racef 1 = 'White'
                    2 = 'Black'
                    3 = 'Asian'
                    4 = 'American Indian or Alaska Native'
                    8 = 'More than one race or ethnic background';
        value ethnf 1 = 'Hispanic'
                    2 = 'Non-Hispanic';
        value incomef 1.1, 1.2, 1.3 = '<$25,000'
                      2             = '$25,000-$49,999'
                      3             = '$50,000-$74,999'
                      4, 5, 6       = '>=$75,000';
        value eduf 1, 2, 3       = 'Less than high school'
                   4, 5          = 'High-school graduate'
                   6, 7, 8       = 'Some college'
                   9, 10, 11, 12 = 'College graduate';
        value procf 7 = 'Upper gastrointenstinal tract endoscopy'
                8 = 'Stricture dilation'
                9 = 'Ventral hernia repair'
                10 = 'Exploratory laparotomy'
                11 = 'Wound drainage'
                12 = 'Lysis of adhesions'
                13 = 'Gastrostomy'
                16 = 'Sleeve gastrectomy converted to gastric bypass'
                20 = 'Repair of internal hernia'
                21 = 'Cholecystectomy'
                25 = 'Appendectomy'
                27 = 'Bowel resiction or diverting stoma'
                28 = 'Luminal stent placement for leak'
                30 = 'Appendicostomy for antegrade enemas';
        value groupf 1 = 'Intraabdominal operations'
                     2 = 'Endoscopic procedures';
```

```
proc import datafile = '/prj/niddk/ims_analysis/Teen_Labs/private_orig_data/TeenLABS_NEJMUpdated/Events and Person time data NIH data
repository 03_20_17.xlsx'
        dbms = xlsx
        out = person_time_data;
        getnames = yes;
run;

data teen_labs_ancillary;
        set tlabsdat.variable_listing_nejm;

data complications;
        set tlabsdat.complications_nejm;

proc contents data = teen_labs_ancillary;

proc freq data = teen_labs_ancillary;
        tables visit;

proc freq data = teen_labs_ancillary;
        tables surg;
        where visit=1;

data table1;
        set teen_labs_ancillary;
        if visit=1 and surg in (1,5);

data year3;
        set teen_labs_ancillary;
        if visit=36 and surg in (1,5);

proc sort data = year3;
        by id_new;

proc sort data = table1;
        by id_new;

data table1;
        merge table1 (in=val1 rename = (weight = weight_bl height=height_bl bmi=bmi_bl))
              year3  (keep=id_new weight height bmi rename = (weight = weight_yr3 height=height_yr3 bmi=bmi_yr3));
        by id_new;
        if 13 <= ageatsurg <= 15 then age_group=1;
        else if 16 <= ageatsurg <= 17 then age_group=2;
        else if 18 <= ageatsurg <= 19 then age_group=3;
        weight_change = (weight_yr3-weight_bl);
        weight_percent_change = (weight_change/weight_bl)*100;
        height_change = (height_yr3-height_bl);
        height_percent_change = (height_change/height_bl)*100;
        bmi_change = (bmi_yr3-bmi_bl);
        bmi_percent_change = (bmi_change/bmi_bl)*100;
        gfr=77.24*(cysc**-1.2623);
        if dmconfirm = 1 and diabmed=0 then diab_bl = .;
```

```
        else if dmconfirm=1 and diabmed=1 then diab_bl=1;
        else diab_bl=0;
        if tgnet >= 130 or ldl >= 130 or . < hdl < 40 or lipidmed = 1 then dyslipidemia=1;
        else if tgnet ne . and ldl ne . and hdl ne . and lipidmed ne . then dyslipidemia = 0;
        if ageatsurg < 18 then do;
                if bpmed=1 or sbp_percentile >= 95 or dbp_percentile >= 95 then elevated_bp=1;
                else if sbp_percentile ne . and dbp_percentile ne . and bpmed ne . then elevated_bp=0;
        end;
        else if ageatsurg >= 18 then do;
                if sbp>=140 or dbp>=90 or bpmed=1 then elevated_bp=1;
                else if sbp ne . and dbp ne . and bpmed ne . then elevated_bp=0;
        end;
        if (. < gfr < 90 and uacratio > 0.04) or (gfr >= 90 and uacratio > 0.03) then abnormal_kidney_function=1;
        else if gfr ne . and uacratio ne . then abnormal_kidney_function = 0;
        if val1 then output;

data table2;
        merge table1 (in=val1 keep=id_new predmconfirm diab_bl dyslipidemia elevated_bp abnormal_kidney_function)
                year3  (in=val2 drop=predmconfirm);
        by id_new;
        gfr=77.24*(cysc**-1.2623);
        if predmconfirm=1 then do;
                if (. < hba1c < 5.7) or (hba1c = . and fasting=1 and glu < 100) then predm_remission=1;
                else if hba1c ne . then predm_remission=0;
        end;
        if diab_bl=1 then do;
                if (. < hba1c < 6.5) or (hba1c = . and fasting=1 and glu < 126) then diab_remission=1;
                else if hba1c ne . then diab_remission=0;
        end;
        if dyslipidemia=1 then do;
                if (ageatsurg+3) < 21 then do;
                        if lipidmed=0 and . < tgnet < 130 and . < ldl < 130 and hdl >= 40 then dyslipidemia_remission=1;
                        else if tgnet ne . and ldl ne . and hdl ne . and lipidmed ne . then dyslipidemia_remission = 0;
                end;
                if (ageatsurg+3) >= 21 then do;
                        if lipidmed=0 and . < tgnet < 200 and . < ldl < 160 and ((hdl >= 40 and sex=1) or (hdl >= 50 and sex=2)) then
dyslipidemia_remission=1;
                        else if tgnet ne . and ldl ne . and hdl ne . and lipidmed ne . then dyslipidemia_remission = 0;
                end;
        end;
        if elevated_bp=1 then do;
                if (ageatsurg+3) < 18 then do;
                        if . < sbp_percentile < 95 and . < dbp_percentile < 95 and bpmed = 0 then elevated_bp_remission=1;
                        else if sbp_percentile ne . and dbp_percentile ne . and bpmed ne . then elevated_bp_remission=0;
                end;
                if (ageatsurg+3) >= 18 then do;
                        if . < sbp < 140 and . < dbp < 90 and bpmed=0 then elevated_bp_remission=1;
                        else if sbp ne . and dbp ne . and bpmed ne . then elevated_bp_remission=0;
                end;
        end;
        if abnormal_kidney_function=1 then do;
```

```
                  if gfr >= 60 and . < uacratio < 0.06 then abnormal_kidney_remission=1;
                  else if gfr ne . and uacratio ne . then abnormal_kidney_remission=0;
            end;
            if val1 and val2 then output;

proc freq data = table1;
      tables surg;
      format surg surgf.;

proc sort data = table1;
      by surg;

proc means data = table1 n mean std;
      var ageatsurg;
      class surg;
      types () surg;
      format surg surgf.;
      title 'Table 1 - Age';

proc freq data = table1;
      tables age_group;
      format age_group agef.;
      title 'Table 1 - Age Group';

proc freq data = table1;
      tables age_group;
      by surg;
      format age_group agef. surg surgf.;

proc freq data = table1;
      tables sex;
      format sex sexf.;
      title 'Table 1 - Sex';

proc freq data = table1;
      tables sex;
      by surg;
      format sex sexf. surg surgf.;

proc freq data = table1;
      tables race;
      format race racef.;
      title 'Table 1 - Race or ethnic background';

proc freq data = table1;
      tables race;
      by surg;
      format race racef. surg surgf.;

proc freq data = table1;
      tables ethn;
```

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```
          format ethn ethnf.;
          title 'Table 1 - Hispanic ethnic background';

proc freq data = table1;
          tables ethn;
          by surg;
          format ethn ethnf. surg surgf.;

proc freq data = table1;
          tables pcghincome;
          format pcghincome incomef.;
          title 'Table 1 - Household income';

proc freq data = table1;
          tables pcghincome;
          by surg;
          format pcghincome incomef. surg surgf.;

proc freq data = table1;
          tables pcgeduc;
          format pcgeduc eduf.;
          title 'Table 1 - Caregiver level of education';

proc freq data = table1;
          tables pcgeduc;
          by surg;
          format surg surgf. pcgeduc eduf.;

proc means data = table1 n mean lclm uclm;
          var weight_bl weight_yr3 weight_change weight_percent_change;
          class surg;
          types () surg;
          format surg surgf.;
          title 'Table 1 - Mean weight';

proc means data = table1 n mean lclm uclm;
          var height_bl height_yr3 height_change height_percent_change;
          class surg;
          types () surg;
          format surg surgf.;
          title 'Table 1 - Mean height';

proc means data = table1 n mean lclm uclm;
          var bmi_bl bmi_yr3 bmi_change bmi_percent_change;
          class surg;
          types () surg;
          format surg surgf.;
          title 'Table 1 - Mean BMI';

proc sort data=table2;
          by surg;
```

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```
proc freq data = table1;
      tables diab_bl /bin (level='1');
      title 'Table 2 – Diabetes at baseline';

proc freq data = table1;
      tables diab_bl /bin (level='1');
      by surg;
      format surg surgf.;

proc freq data = table2;
      tables diab_remission /bin (level='1');
      title 'Table 2 – Diabetes remission at year 3';

proc freq data = table2;
      tables diab_remission /bin (level='1');
      by surg;
      format surg surgf.;

proc freq data = table1;
      tables predmconfirm /bin (level='1');
      title 'Table 2 – Prediabetes at baseline';

proc freq data = table1;
      tables predmconfirm /bin (level='1');
      by surg;
      format surg surgf.;

proc freq data = table2;
      tables predm_remission /bin (level='1');
      title 'Table 2 – Prediabetes remission at year 3';

proc freq data = table2;
      tables predm_remission /bin (level='1');
      by surg;
      format surg surgf.;

proc freq data = table1;
      tables dyslipidemia /bin (level='1');
      title 'Table 2 – Dyslipidemia at baseline';

proc freq data = table1;
      tables dyslipidemia /bin (level='1');
      by surg;
      format surg surgf.;

proc freq data = table2;
      tables dyslipidemia_remission /bin (level='1');
      title 'Table 2 – Dyslipidemia remission at year 3';

proc freq data = table2;
```

```
        tables dyslipidemia_remission /bin (level='1');
        by surg;
        format surg surgf.;

proc freq data = table1;
        tables elevated_bp /bin (level='1');
        title 'Table 2 – Elevated blood pressure at baseline';

proc freq data = table1;
        tables elevated_bp /bin (level='1');
        by surg;
        format surg surgf.;

proc freq data = table2;
        tables elevated_bp_remission /bin (level='1');
        title 'Table 2 – Elevated blood pressure remission at year 3';

proc freq data = table2;
        tables elevated_bp_remission /bin (level='1');
        by surg;
        format surg surgf.;

proc freq data = table1;
        tables abnormal_kidney_function /bin (level='1');
        title 'Table 2 – Abnormal kidney function at baseline';

proc freq data = table1;
        tables abnormal_kidney_function /bin (level='1');
        by surg;
        format surg surgf.;

proc freq data = table2;
        tables abnormal_kidney_remission /bin (level='1');
        title 'Table 2 – Abnormal kidney function remission at year 3';

proc freq data = table2;
        tables abnormal_kidney_remission /bin (level='1');
        by surg;
        format surg surgf.;

data table3;
        set table1
            year3;
        if albs >= 3.5 then abnormal_albumin = 0;
        else if . < albs < 3.5 then abnormal_albumin = 1;
        if . < folat <= 5.8 then abnormal_folate=1;
        else if folat > 5.8 then abnormal_folate=0;
        if . < vb12 < 145 then abnormal_vb12=1;
        else if vb12 >= 145 then abnormal_vb12=0;
        if . < vd < 20.1 then abnormal_vd=1;
        else if vd >= 20.1 then abnormal_vd=0;
```

```
                if pth > 88 then abnormal_pth=1;
                else if . < pth <= 88 then abnormal_pth=0;
                if . < vita < 301 then abnormal_vita=1;
                else if vita >= 301 then abnormal_vita=0;
                if vitb1g >= 1.3 then abnormal_vitb1=1;
                else if . < vitb1g < 1.3 then abnormal_vitb1=0;
                if sex=1 then do;
                        if . < fer < 20 then abnormal_fer=1;
                        else if fer >= 20 then abnormal_fer=0;
                        if trsf > 392 then abnormal_trsf=1;
                        else if . < trsf <= 392 then abnormal_trsf=0;
                end;
                if sex=2 then do;
                        if . < fer < 10 then abnormal_fer=1;
                        else if fer >= 10 then abnormal_fer=0;
                        if trsf > 382 then abnormal_trsf=1;
                        else if . < trsf <= 382 then abnormal_trsf=0;
                end;

proc sort data = table3;
        by surg;

proc freq data = table3;
        tables abnormal_albumin /bin (level='1');
        where visit=1;
        title 'Table 3 - Low Albumin Level, Baseline';

proc freq data = table3;
        tables abnormal_albumin /bin (level='1');
        by surg;
        format surg surgf.;
        where visit=1;

proc freq data = table3;
        tables abnormal_albumin /bin (level='1');
        where visit=36;
        title 'Table 3 - Low Albumin Level, Year 3';

proc freq data = table3;
        tables abnormal_albumin /bin (level='1');
        by surg;
        format surg surgf.;
        where visit=36;

proc freq data = table3;
        tables abnormal_folate /bin (level='1');
        where visit=1;
        title 'Table 3 - Low Folate Level, Baseline';

proc freq data = table3;
        tables abnormal_folate /bin (level='1');
```

```
      by surg;
      format surg surgf.;
      where visit=1;

proc freq data = table3;
      tables abnormal_folate /bin (level='1');
      where visit=36;
      title 'Table 3 - Low Folate Level, Year 3';

proc freq data = table3;
      tables abnormal_folate /bin (level='1');
      by surg;
      format surg surgf.;
      where visit=36;

proc freq data = table3;
      tables abnormal_vb12 /bin (level='1');
      where visit=1;
      title 'Table 3 - Low Vitamin B12 Level, Baseline';

proc freq data = table3;
      tables abnormal_vb12 /bin (level='1');
      by surg;
      format surg surgf.;
      where visit=1;

proc freq data = table3;
      tables abnormal_vb12 /bin (level='1');
      where visit=36;
      title 'Table 3 - Low Vitamin B12 Level, Year 3';

proc freq data = table3;
      tables abnormal_vb12 /bin (level='1');
      by surg;
      format surg surgf.;
      where visit=36;

proc freq data = table3;
      tables abnormal_vd /bin (level='1');
      where visit=1;
      title 'Table 3 - Low 25-OH Vitamin D Level, Baseline';

proc freq data = table3;
      tables abnormal_vd /bin (level='1');
      by surg;
      format surg surgf.;
      where visit=1;

proc freq data = table3;
      tables abnormal_vd /bin (level='1');
      where visit=36;
```

```
              title 'Table 3 - Low 25-OH Vitamin D Level, Year 3';

proc freq data = table3;
        tables abnormal_vd /bin (level='1');
        by surg;
        format surg surgf.;
        where visit=36;

proc freq data = table3;
        tables abnormal_pth /bin (level='1');
        where visit=1;
        title 'Table 3 - High parathyroid hormone level, Baseline';

proc freq data = table3;
        tables abnormal_pth /bin (level='1');
        by surg;
        format surg surgf.;
        where visit=1;

proc freq data = table3;
        tables abnormal_pth /bin (level='1');
        where visit=36;
        title 'Table 3 - High parathyroid hormone level, Year 3';

proc freq data = table3;
        tables abnormal_pth /bin (level='1');
        by surg;
        format surg surgf.;
        where visit=36;

proc freq data = table3;
        tables abnormal_fer /bin (level='1');
        where visit=1;
        title 'Table 3 - Low Ferritin Level, Baseline';

proc freq data = table3;
        tables abnormal_fer /bin (level='1');
        by surg;
        format surg surgf.;
        where visit=1;

proc freq data = table3;
        tables abnormal_fer /bin (level='1');
        where visit=36;
        title 'Table 3 - Low Ferritin Level, Year 3';

proc freq data = table3;
        tables abnormal_fer /bin (level='1');
        by surg;
        format surg surgf.;
        where visit=36;
```

```
proc freq data = table3;
      tables abnormal_trsf /bin (level='1');
      where visit=1;
      title 'Table 3 - High transferrin Level, Baseline';

proc freq data = table3;
      tables abnormal_trsf /bin (level='1');
      by surg;
      format surg surgf.;
      where visit=1;

proc freq data = table3;
      tables abnormal_trsf /bin (level='1');
      where visit=36;
      title 'Table 3 - High transferrin Level, Year 3';

proc freq data = table3;
      tables abnormal_trsf /bin (level='1');
      by surg;
      format surg surgf.;
      where visit=36;

proc freq data = table3;
      tables abnormal_vita /bin (level='1');
      where visit=1;
      title 'Table 3 - Low Vitamin A Level, Baseline';

proc freq data = table3;
      tables abnormal_vita /bin (level='1');
      by surg;
      format surg surgf.;
      where visit=1;

proc freq data = table3;
      tables abnormal_vita /bin (level='1');
      where visit=36;
      title 'Table 3 - Low Vitamin A Level, Year 3';

proc freq data = table3;
      tables abnormal_vita /bin (level='1');
      by surg;
      format surg surgf.;
      where visit=36;

proc freq data = table3;
      tables abnormal_vitb1 /bin (level='1');
      where visit=1;
      title 'Table 3 - High Vitamin B1 erythrocyte transkelotase activity Level, Baseline';

proc freq data = table3;
```

```
        tables abnormal_vitb1 /bin (level='1');
        by surg;
        format surg surgf.;
        where visit=1;

proc freq data = table3;
        tables abnormal_vitb1 /bin (level='1');
        where visit=36;
        title 'Table 3 - High Vitamin B1 erythrocyte transkelotase activity Level, Year 3';

proc freq data = table3;
        tables abnormal_vitb1 /bin (level='1');
        by surg;
        format surg surgf.;
        where visit=36;

proc sort data=table1;
        by id_new;

proc sort data = complications;
        by id_new;

data table4;
        length group $25.;
        merge table1          (in=val1)
              complications (in=val2);
        by id_new;
        if procedure in (9, 10, 11, 12, 13, 16, 30, 20, 27, 28, 21, 25) then group='Intraabdominal operations';
        else if procedure in (7,8) then group='Endoscopic procedures';
        if val1 then output table4;

data table4_patients;
        set table4;
        by id_new;
        retain has_7 has_8 has_9 has_10 has_11 has_12 has_13 has_16 has_30 has_20 has_27 has_28 has_21 has_25 0;
        if first.id_new then do;
                has_7 =0;
                has_8 =0;
                has_9 =0;
                has_10 =0;
                has_11 =0;
                has_12 =0;
                has_13 =0;
                has_16 =0;
                has_30 =0;
                has_20 =0;
                has_27 =0;
                has_28 =0;
                has_21 =0;
                has_25 =0;
        end;
```

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```
        if procedure=7 then has_7=1;
        if procedure=8 then has_8=1;
        if procedure=9 then has_9=1;
        if procedure=10 then has_10=1;
        if procedure=11 then has_11=1;
        if procedure=12 then has_12=1;
        if procedure=13 then has_13=1;
        if procedure=16 then has_16=1;
        if procedure=30 then has_30=1;
        if procedure=20 then has_20=1;
        if procedure=27 then has_27=1;
        if procedure=28 then has_28=1;
        if procedure=21 then has_21=1;
        if procedure=25 then has_25=1;
        if has_7 or has_8 then has_endoscopic_procedures=1;
        else has_endoscopic_procedures=0;
        if has_9 or has_10 or has_11 or has_12 or has_13 or has_16 or has_30 or has_20 or has_27 or has_28 or has_21 or has_25 then
has_intraabdominal_op=1;
        else has_intraabdominal_op=0;
        if last.id_new then output;

proc sort data = person_time_data;
        by title;

data table4_event_totals;
        set person_time_data;
        by title;
        retain total_time total_events 0;
        if first.title then do;
                total_time = 0;
                total_events = 0;
        end;
        total_time = total_time + pt;
        total_events = total_events+events;
        if last.title then output;

data table4_event_totals;
        set table4_event_totals;
        event_rate = (total_events/total_time)*300;
        if title in ('Ventral Hernia Repair', 'Exploratory Laparatomy', 'Lysis of Adhesions', 'Wound Drainage', 'Appendectomy',
'Appendiostomy for Incontinence', 'Bowel Resection or Diverting Stoma', 'Cholecystectomy',
                                                'Gastrostomy', 'Lumenal Stent Placement for Leak', 'Repair of Internal Hernia',
'VSG Converted to RYGB') then group = 1 ;
        else group = 2;

proc sort data = table4_event_totals;
        by group;

data table4_event_totals_group;
        set     table4_event_totals;
        by group;
```

```
        retain total 0;
        if first.group then total = 0;
        total = total+event_rate;
        if last.group then output;


data person_time_data;
        set person_time_data;
        event_rate = (events/pt)*300;
        if title in ('Ventral Hernia Repair', 'Exploratory Laparatomy', 'Lysis of Adhesions', 'Wound Drainage', 'Appendectomy',
'Appendiostomy for Incontinence', 'Bowel Resection or Diverting Stoma', 'Cholecystectomy',
                                                    'Gastrostomy', 'Lumenal Stent Placement for Leak', 'Repair of Internal Hernia',
'VSG Converted to RYGB') then group = 1 ;
        else group = 2;


proc sort data = person_time_data;
        by surg group;


data person_time_data_group;
        set     person_time_data;
        by surg group;
        retain total 0;
        if first.group then total = 0;
        if event_rate ne . then total = total+event_rate;
        if last.group then output;


proc freq data = table4_patients;
        tables has_endoscopic_procedures has_7 has_8 has_intraabdominal_op has_9 has_10 has_11 has_12 has_13 has_16 has_30 has_20
has_27 has_28 has_21 has_25 ;
        format procedure procf.;
        title 'Table 4 - Patients';


proc sort data = table4_patients;
        by surg;


proc freq data = table4_patients;
        tables has_endoscopic_procedures has_7 has_8 has_intraabdominal_op has_9 has_10 has_11 has_12 has_13 has_16 has_30 has_20
has_27 has_28 has_21 has_25;
        by surg;
        format procedure procf. surg surgf.;


proc freq data = table4;
        tables group procedure;
        format procedure procf.;
        title 'Table 4 - Events';


proc sort data = table4;
        by surg;


proc freq data = table4;
        tables group procedure;
        by surg;
```

```
        format procedure procf. surg surgf.;

proc print data = table4_event_totals noobs;
        var title event_rate;
        title 'Table 4 - Event rate - All';

proc print data = table4_event_totals_group noobs;
        var group total;
        format group groupf.;

proc sort data = person_time_data;
        by surg;

proc print data = person_time_data noobs;
        var title surg event_rate;
        title 'Table 4 - Event rate - By Surgery';

proc print data = person_time_data_group noobs;
        var group surg total;
        format group groupf.;
```